## In the Claims

Please replace all prior versions, and listings, of claims in the application with the following list of claims:

1. – 23. (Canceled)

24. (Currently Amended) For a very high rate digital subscriber line transmission system having a plurality of modems operating on an access network in which at least some of said modems operate on wires of different lengths and in which there is a target bit rate for each modem, a method of redistributing available bandwidth which includes reducing the transmit power of modems on relatively short wires so that far-end cross talk produced by said modems is reduced, enabling modems on substantially longer wires to transmit at higher bit rates, the method further including producing an energy loading $E_k$ for the k[th] sub-carrier given by:

$$E_k = \lambda \frac{n_k}{F_k}$$

where $n_k$ is the background noise on sub-carrier k, $F_k$ is the far-end cross talk transfer function for said given wire and $\lambda$ is a constant, $\lambda$ being adjusted so that

$$R = \sum_{k=0}^{N-1} \log_2 (1 + \frac{E_k}{\Gamma(n_k + Fext_k)\Gamma_M})$$

where $Fext_k$ is a far-end cross talk from other very high rate digital subscriber line modems, $\Gamma$ is a signal to noise ratio -gap, $\Gamma_M$ is a system margin and R is a target bit rate per discrete multitone frame .

25. (Previously Presented) A method as claimed in claim 24, wherein said relatively short wires are less than or equal to 1,000 meters long, and wherein said substantially longer wires are more than 1,000 meters long.

26. (Previously Presented) A method as claimed in claim 24, including distributing power over an available frequency band so that said target bit rate is achieved.

27. (Previously Presented) A method, as claimed in claim 24, including modulating transmitted data using discrete multitone.

28. (Canceled)

29. (Currently Amended) A method, as claimed in claim ~~28~~ 24, wherein said far-end cross talk transfer function $F_k$ is given by:

$$F_k = K \mid H_k \mid^2 f_k{}^2 d$$

where $H_k$ is a transfer function for the given wire, $f_k$ is a frequency for sub-carrier k, d is a length of the wire and K is a constant.

30. (Currently Amended) A method, as claimed in claim ~~28~~ 24, wherein $E_k$ is always less than a maximum allowable power spectral density-level, $PSD_{max}$ for said very high rate digital subscriber line system.

31. (Currently Amended) A method as claimed in claim 30, wherein:

$$E_k = \lambda \frac{n_k}{F_k} \quad \text{for} \quad \lambda \frac{n_k}{F_k} < PSD_{\max} \underline{\text{; and}}$$

~~and~~

$$E_k = PSD_{\max} \quad \text{for} \quad \lambda \frac{n_k}{F_k} \geq PSD_{\max}.$$

32. (Currently Amended) For a very high rate digital subscriber line transmission system having a plurality of modems operating on an access network in which at least some of said modems operate on wires of different lengths and in which there is a target bit rate for each modem, a method of constraining transmission energy of at least one modem on a relatively short wire, by applying power back-off so as to force said transmission energy loading toward said target bit rate, in order to reduce far-end cross talk produced by said modem, enabling modems on substantially longer wires to transmit at higher bit rates, the method further including producing an energy loading $E_k$ for the $k^{th}$ sub-carrier given by:

$$\underline{E_k = \lambda \frac{n_k}{F_k}}$$

where $n_k$ is the background noise on sub-carrier k, $F_k$ is the far-end cross talk transfer function for said given wire and $\lambda$ is a constant, $\lambda$ being adjusted so that

$$R = \sum_{k=0}^{N-1} \log_2 \left(1 + \frac{E_k}{\Gamma(n_k + Fext_k)\Gamma_M}\right)$$

where $Fext_k$ is a far-end cross talk from other very high rate digital subscriber line modems, $\Gamma$ is a signal to noise ratio -gap, $\Gamma_M$ is a system margin and R is a target bit rate per discrete multitone frame.

33. (Canceled)

34. (Currently Amended) A method, as claimed in claim ~~33~~ 32, wherein said far-end cross talk transfer function $F_k$ is given by:

$$F_k = K \,|\, H_k \,|^2 \, f_k^{\,2} d$$

where $H_k$ is a transfer function for the given wire, $f_k$ is a frequency for sub-carrier k, d is a length of the wire and K is a constant.

35. (Currently Amended) A method, as claimed in claim ~~33~~ 32, wherein $E_k$ is always less than a maximum allowable power spectral density-level, $PSD_{max}$ for said very high rate digital subscriber line system.

36. (Currently Amended) A method, as claimed in claim 35, wherein:

$$E_k = \lambda \frac{n_k}{F_k} \quad \text{for} \quad \lambda \frac{n_k}{F_k} < PSD_{\max} \text{; and}$$

~~and~~

$$E_k = PSD_{\max} \quad \text{for} \quad \lambda \frac{n_k}{F_k} \geq PSD_{\max}.$$

37. (Currently Amended) A very high rate digital subscriber line system, comprising:

a station;

a first modem connected to the station with a wire; and

a second modem connected to the station with a wire, and comprising a means for controlling transmission output to approach a target bit rate to effectively distribute overall system bandwidth, said means for controlling transmission adapted to produce an energy loading $E_k$ for the $k^{th}$ sub-carrier given by:

$$E_k = \lambda \frac{n_k}{F_k}$$

where $n_k$ is the background noise on sub-carrier k, $F_k$ is the far-end cross talk transfer function for said given wire and $\lambda$ is a constant, $\lambda$ being adjusted so that

$$R = \sum_{k=0}^{N-1} \log_2 (1 + \frac{E_k}{\Gamma(n_k + Fext_k)\Gamma_M})$$

where $Fext_k$ is a far-end cross talk from other very high rate digital subscriber line modems, $\Gamma$ is a signal to noise ratio -gap, $\Gamma_M$ is a system margin and R is a target bit rate per discrete multitone frame.

38. (Previously Presented) The system as claimed in claim 37, wherein the means for controlling transmission output utilizes a relatively short wire to access the system.

39. (Previously Presented) The system as claimed in claim 38, wherein the relatively short wire is a wire less than or equal to 1000 meters long.

40. (Previously Presented) The system as claimed in claim 37, wherein the first modem utilizes a relatively long wire to access the system.

41. (Previously Presented) The system as claimed in claim 40, wherein the relatively long wire is a wire more than 1000 meters long.

42. (Currently Amended) The system as claimed in claim 37, wherein the means for controlling transmission output reduces far-end crosstalk.

43. (New) The system, as claimed in claim 37, wherein said far-end cross talk transfer function $F_k$ is given by:

$$F_k = K \mid H_k \mid^2 f_k^{\,2} d$$

where $H_k$ is a transfer function for the given wire, $f_k$ is a frequency for sub-carrier k, d is a length of the wire and K is a constant.

44. (New) The system, as claimed in claim 37, wherein $E_k$ always less than a maximum allowable power spectral density-level, $PSD_{max}$ for said very high rate digital subscriber line system.

45. (New) The system, as claimed in claim 37, wherein:

$$E_k = \lambda \frac{n_k}{F_k} \quad \text{for} \quad \lambda \frac{n_k}{F_k} < PSD_{\max}\text{; and}$$

$$E_k = PSD_{\max} \quad \text{for} \quad \lambda \frac{n_k}{F_k} \geq PSD_{\max}.$$

46. (New) A very high rate digital subscriber line transmission system having a plurality of modems operating on an access network in which at least some of said modems operate on wires of different lengths and in which there is a target bit rate for each modem, wherein each of at least some of said modems include a control means adapted to produce an energy loading for the $k^{th}$ sub-carrier given by:

$$E_k = \lambda \frac{n_k}{F_k}$$

where $n_k$ is the background noise on sub-carrier k, $F_k$ is the far-end cross talk transfer function for the wire the modem is connected to, and $\lambda$ is a constant adjusted so that

$$R = \sum_{k=0}^{N-1} \log_2 \left(1 + \frac{E_k}{\Gamma(n_k + Fext_k)\Gamma_M}\right)$$

where $Fext_k$ is a far-end cross talk from other very high rate digital subscriber line modems, $\Gamma$ is a signal to noise ratio - gap, $\Gamma_M$ is the system margin and R is the target bit rate per discrete multitone frame.

47. (New) A very high rate digital subscriber line transmission system, as claimed in claim 46, wherein said system is adapted to modulate transmitted data using discrete multitone.

48. (New) A very high rate digital subscriber line transmission system, as claimed in claim 46, wherein said far-end cross talk transfer function is given by:

$$F_k = K\,|\,H_k\,|^2\, f_k^{\,2} d$$

where $H_k$ is a transfer function for the given wire, $f_k$ is a frequency for sub-carrier k, d is the length of the wire and K is a constant.

49. (New) A very high rate digital subscriber line transmission system, as claimed in claim 46, wherein $E_k$ is always less than a maximum allowable power spectral density-level, $PSD_{max}$, for said very high rate digital subscriber line system.

50. (New) A very high rate digital subscriber line transmission system, as claimed in claim 48, wherein $E_k$ is always less than a maximum allowable power spectral density-level, $PSD_{max}$, for said very high rate digital subscriber line system.

51. (New) A very high rate digital subscriber line transmission system, as claimed in claim 49, wherein:

$$E_k = \lambda \frac{n_k}{F_k} \quad \text{for} \quad \lambda \frac{n_k}{F_k} < PSD_{\max}\text{; and}$$

$$E_k = PSD_{\max} \quad \text{for} \quad \lambda \frac{n_k}{F_k} \geq PSD_{\max}.$$

52. (New) A very high rate digital subscriber line transmission system, as claimed in claim 50, wherein:

$$E_k = \lambda \frac{n_k}{F_k} \quad \text{for} \quad \lambda \frac{n_k}{F_k} < PSD_{\max}\text{; and}$$

$$E_k = PSD_{\max} \quad \text{for} \quad \lambda \frac{n_k}{F_k} \geq PSD_{\max}.$$

53. (New) A modem for use with a very high rate digital subscriber line transmission system having a plurality of modems, said modem having a target bit rate, wherein the modem includes a control means adapted to produce an energy loading for the $k^{th}$ sub-carrier given by:

$$E_k = \lambda \frac{n_k}{F_k}$$

where $n_k$ is the background noise on sub-carrier k, $F_k$ is the far-end cross talk transfer function for the wire the modem is connected to, and $\lambda$ is a constant adjusted so that

$$R = \sum_{k=0}^{N-1} \log_2 \left(1 + \frac{E_k}{\Gamma(n_k + Fext_k)\Gamma_M}\right)$$

where $Fext_k$ is a far-end cross talk from other very high rate digital subscriber line modems, $\Gamma$ is a signal to noise ratio -gap, $\Gamma_M$ is the system margin and R is the target bit rate per discrete multitone frame.

54. (New) In a very high rate digital subscriber line transmission system having a plurality of modems operating on an access network in which at least some of said modems operate on wires of different lengths and in which there is a target bit rate for each modem, a method of performing power back-off, wherein modems on shorter wires reduce their transmitting power in order to lower the far-end crosstalk they produce, by producing an energy loading of the $k^{th}$ sub-carrier given by:

$$E_k = \lambda \frac{n_k}{F_k}$$

where $n_k$ is the background noise on sub-carrier k, $F_k$ is the far-end cross talk transfer function for the corresponding wire, and $\lambda$ is a constant which is adjusted so that

$$R = \sum_{k=0}^{N-1} \log_2 \left(1 + \frac{E_k}{\Gamma(n_k + Fext_k)\Gamma_M}\right)$$

where $Fext_k$ is a far-end cross talk from other very high rate digital subscriber line modems, $\Gamma$ is a signal to noise ratio -gap, $\Gamma_M$ is the system margin and R is the target bit rate per discrete multitone frame.

55. (New) A method, as claimed in claim 54, wherein transmitted data is modulated using discrete multitone.

56. (New) A method, as claimed in claim 54, wherein said far-end cross talk transfer function is given by:

$$F_k = K\,|\,H_k\,|^2\, f_k{}^2 d$$

where $H_k$ is a transfer function for the given wire, $f_k$ is a frequency for sub-carrier k, d is a length of the wire and K is a constant.

57. (New) A method, as claimed in claim 54, wherein $E_k$ is always than a maximum allowable power spectral density-level, $PSD_{max}$, for said very high rate digital subscriber line system.

58. (New) A method, as claimed in claim 56, wherein $E_k$ is always than a maximum allowable power spectral density-level, $PSD_{max}$, for said very high rate digital subscriber line system.

59. (New) A method, as claimed in claim 57, wherein:

$$E_k = \lambda \frac{n_k}{F_k} \quad \text{for} \quad \lambda \frac{n_k}{F_k} < PSD_{\max}\text{; and}$$

$$E_k = PSD_{\max} \quad \text{for} \quad \lambda \frac{n_k}{F_k} \geq PSD_{\max}.$$

60. (New) A method, as claimed in claim 58, wherein:

$$E_k = \lambda \frac{n_k}{F_k} \quad \text{for} \quad \lambda \frac{n_k}{F_k} < PSD_{\max}\text{; and}$$

$$E_k = PSD_{\max} \quad \text{for} \quad \lambda \frac{n_k}{F_k} \geq PSD_{\max}.$$